INL/EXT-08-14264
Revision 2

Senate Energy & Telecomm.Comm.
Exhibit No. 2
Date 1/8/2009
Bill No. Organizational Meeting

The Cost of Not Building Transmission:

Economic Impact of Proposed Transmission Line Projects for the Pacific NorthWest Economic Region

July 2008

EXECUTIVE SUMMARY

The Pacific Northwest Economic Region (PNWER), a regional planning and facilitation organization established in 1991, promotes transboundary policy and planning in the Pacific Northwest. As one of the fastest growing regions in North America, the eight member political jurisdictions (i.e., the states of Washington, Oregon, Idaho, Montana, and Alaska; the provinces of Alberta and British Columbia; and the Yukon Territory) are dedicated to maintaining the $700B (US) regional economy and promoting additional economic growth through regional and bi-national cooperation. Within PNWER, 14 working groups are tasked to promote specific economic interests. The Energy I Working Group is tasked to identify supply and demand issues concerning the availability and cost of energy within the region, which requires the development of adequate and reliable power infrastructure (i.e., energy transmission lines and generation).

To attract new industries and keep pace with rapid growth, world-class communities require a reliable infrastructure of water, energy, transportation, law enforcement, and health-care services. Furthermore, communities must have access to these resources and services at an affordable cost. PNWER currently has adequate infrastructure and power, but capacity reserves are slim. Operating on this edge of reserves, a few PNWER communities and businesses have not been able to capitalize on opportunities for economic growth and higher paying, value-added jobs simply due to the lack of electrical power capacity.

A recent example of a PNWER community losing such an opportunity was Boise, ID, in 2007. Due to the lack of electric power capacity, Boise was not able to capitalize in the expansion of two large technology-based businesses that would have resulted in thousands of high-paying; technology-based jobs. As a result, both firms dropped Boise off their short list of potential build locations. Other examples show similar economic impacts as a result of limited power availability. These include: (1) the 1979 curtailment of electric power to Portland General Electric commercial and industrial customers due to the continued shutdown of the Trojan Nuclear Plant; (2) cuts in aluminum production in December 2000 by several companies in The Dalles, OR, and Goldendale, WA, area so that the Bonneville Power Association could sell the electricity to California and the Pacific Northwest; and (3) FMC closure of the Pocatello, ID, phosphorus plant due to rising electricity costs and other economic factors.

In response, PNWER and the Idaho National Laboratory (INL) conducted a simple impact study to evaluate the cost of not building transmission lines. In this study, probable economic impacts were forecast from a list of proposed electricity generation and transmission projects within and around the PNWER region. This report highlights the scenarios where economic opportunities are lost if key transmission projects identified within PNWER's integrated resource plans (IRPs) are not carried out. While this report ranks evaluated projects according to the INL's assessment of their overall economic impact to PNWER, it should be noted that all of the projects are considered valuable and necessary to adequately address growing electric power needs.

The INL's scoping study included the development of an economic model to evaluate the potential loss of economic activities, as well as the development of a web-based Geographic Information System (GIS) that integrates the proposed project's information and the results of the economic study. These efforts will enable policy makers, utility planners, and the media to track the status of these critical transmission line projects.

Model results are not simply related just to the quantities of power delivered; but rather, they are functionally related to the many economic factors of any community, including average local power use, the economic productivity of a community, and other economic variables that are necessary to promote and maintain business enterprise. These relationships always suggest that the transmission of efficiently produced and available energy is crucial to maintaining an economic base as well as promoting economic growth.

The model indicates that the PNWER region has a potential economic loss of $15B to $25B annually and 300,000 to 450,000 jobs over 30 years if just the one infrastructure transmission line project with the greatest economic impact is not built (i.e., BC to NorCal), and upwards of $55B to $85B annually and 1,750,000 jobs over 30 years if the five transmission line projects of greatest economic impact are not built (i.e., Alberta to PacNW Project, BC to NorCal, Gateway West, Southern Xing & I-5 Corridor Projects, and Mountain States Intertie). These transmission line projects (shown in Figure ES-1) transport bulk power and are considered critical for access to preferred electrical generation by areas with high economic development and growth. Note, however, that even if these five projects come to fruition, the added power will not adequately serve the projected PNWER population increase, assuming consumption habits remain the same.

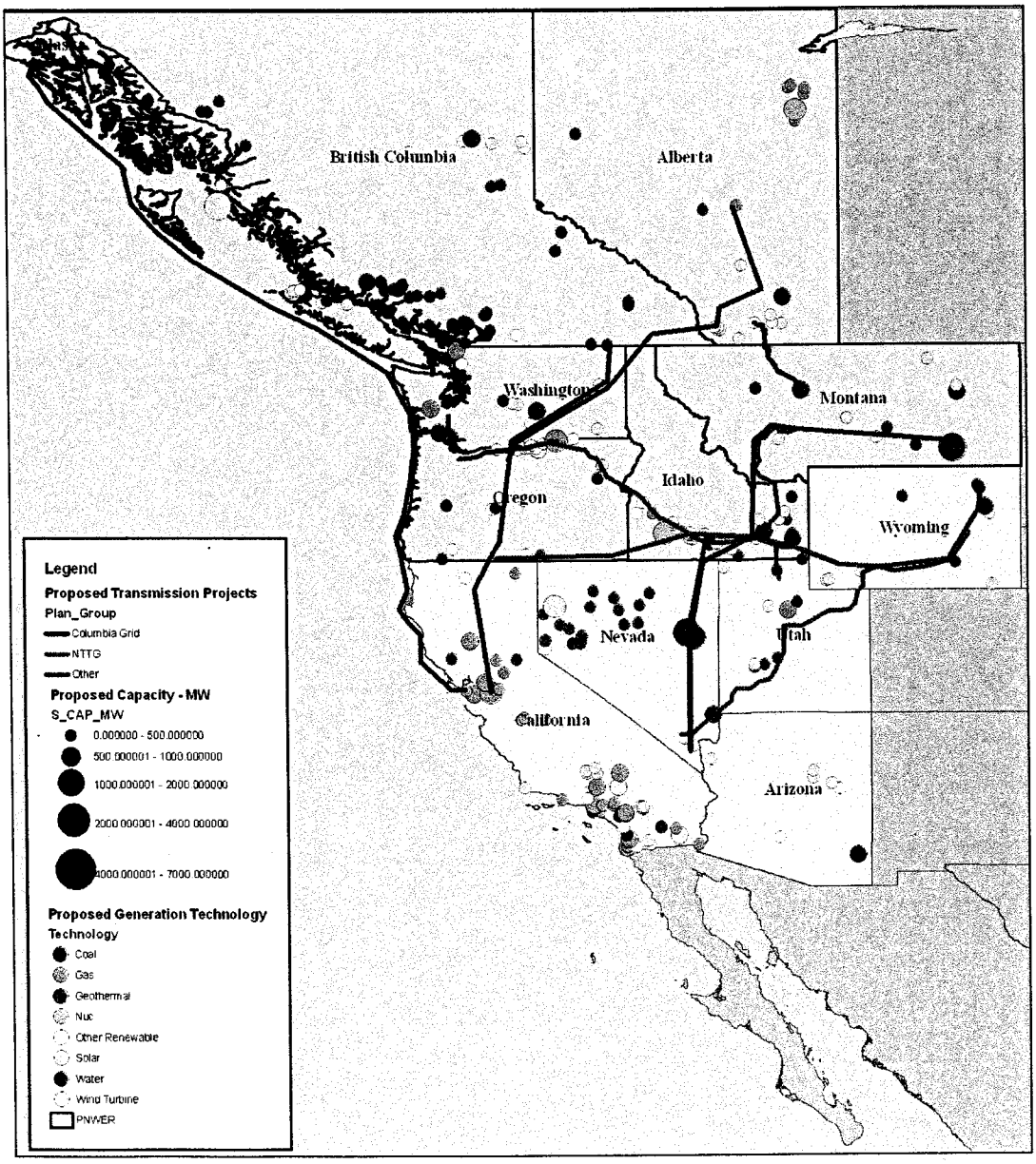


Figure ES-1. Proposed Transmission Line Projects

A major goal of any integrated interregional planning effort is to create a strong electric transmission connection between hubs of low-cost electric power resources and markets of high-load growth potential. The results of this study suggest that all of these transmission projects will be required to support the forecast population growth within PNWER. In a most conservative estimate, these transmission resources will provide a crucial component to the critical infrastructure that will ensure the growth of the PNWER economy by at least $100B (US). However, if these power resources are merely transferred through PNWER to other economic regions, these other economic regions will enjoy the majority of the prosperity and wealth creation that power delivers.

In this analysis, the least desirable transmission projects, as noted above, are those that simply move power through PNWER since the only jobs and wealth created are the result of construction and subsequent maintenance activities for these transmission assets (i.e., Wyoming coal-fired power) to other non-PNWER markets, such as, Utah, Nevada, California, and Arizona. Conversely, the most desirable generation and transmission projects are those that generate power within PNWER for consumption by PNWER customers due to the economic impacts of wealth creation. For this reason, power reliability will prove to be a critical factor in attracting new and clean technology businesses to the PNWER region. These results and prospects create a compelling case for PNWER members to work together to acquire the necessary power transmission assets to ensure PNWER economic gain.

Research supporting this analysis indicates a growing customer and market demand for access to clean, renewable, and reliable energy sources. As a result, more and more states have passed measures to mandate greater use of clean energy resources to reduce greenhouse gases and diversify the energy market, thus adding the need for additional power transmission to supply the power generated at remote "green" resources to locations of "green" power demand. Failure to deliver PNWER's potential supplies of low-cost wind and hydro generation, in addition to the current low-cost coal-fired generation, to PNWER load centers will result in increased electricity cost of at least 40-50% over the next few years as demand growth outstrips the existing power generation and transmission capabilities. Furthermore, access to "green" energy sources (primarily wind, since the majority of the best hydro sites have been developed) will enhance the energy security of PNWER and both nations. In a recent groundbreaking report, entitled *20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply*, one scenario concludes that an economically achievable 20% wind energy supply in the United States by 2030 will dramatically reduce greenhouse gas emissions while enhancing energy security and supplying clean, "green" power. Since PNWER is rich with economically viable wind resources, wind farms will be a critical component to power availability within PNWER as well as provide a viable solution to climate change and energy security.

This study was not designed to be exhaustive or final; rather, its purpose was to identify the probable or potential economic impact of each proposed transmission project to the PNWER community. As a result, other economic issues in electricity generation, transmission, distribution, and use surfaced as to their relationship to economic impact and wealth creation. INL engineers anticipate that as additional transmission project information is acquired and as the model is refined to simulate the year-to-year economic activities within PNWER, a more accurate understanding as to the relationships between income, wealth creation, electricity availability, and price will provide more accurate results. It is, therefore, the perspective of this study that future transmission studies should assess the multiplying impact of developing transmission projects in conjunction with one another, some for the purpose of connecting low-cost resource and others for the purpose of strengthening the spokes between major hubs. A list of recommended specific future studies is as follows:

1. PNWER should explore the interrelationship of transmitted energy vs. distributed gas plants.
2. PNWER should study gas pipeline capacity to meet climate change policy goals.

3. PNWER should study how natural gas power plants influence the cost of natural gas to local/regional consumers and how the plants potentially impact the long-term energy infrastructure.

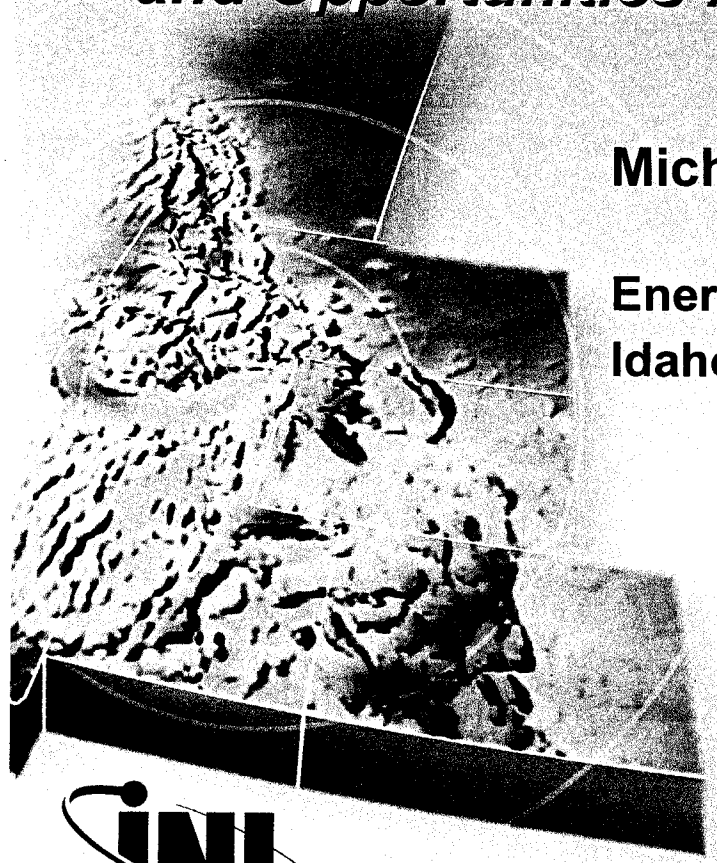
4. Follow-on studies should focus on gathering PNWER regional economic data, especially in trying to understand the value and impact of electricity and its availability and price in the process of economic activities.

5. Follow-on studies should be performed to identify esoteric values of specific transmission projects and identify the generation projects that bring the most value to the PNWER region.

6. Follow-on studies of esoteric values should identify barriers and potential incentives that can be used to promote desirable transmission line projects over those with less value to the PNWER region.

7. A follow-on study should be conducted to look at specific barriers to siting multi-state and bi-national transmission, including environmental concerns.

Bi-National Regional Energy Resources:
Strategic Assets for Addressing Energy Challenges and Opportunities for the 2010's



Michael Hagood

Energy and Environment S&T
Idaho National Laboratory

Senate Energy & Telecomm.Comm.
Exhibit No.
Date
Bill No.

Prepared as Part of
Pacific Northwest Economic Region Delegation
Visit to Montana

January 8, 2009

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Energy Security Risks for the 2010's

- Energy plays a pivotal role in the perfect economic maelstrom hitting our Nation.

- The U.S. is facing oil and gas reserve declines, increased demand, increased foreign dependency, resource nationalization, price volatility, underinvestment, changing domestic production policy

- The U.S. potentially faces crippling electricity brownouts and blackouts beginning in the summer of 2009. High risk due to lack of investment in power plants and transmission. High vulnerability in the West.

"Energy Security" Defined:
- ***Supply Security***
- ***Economic Stability***
- ***Environmental Sustainability***

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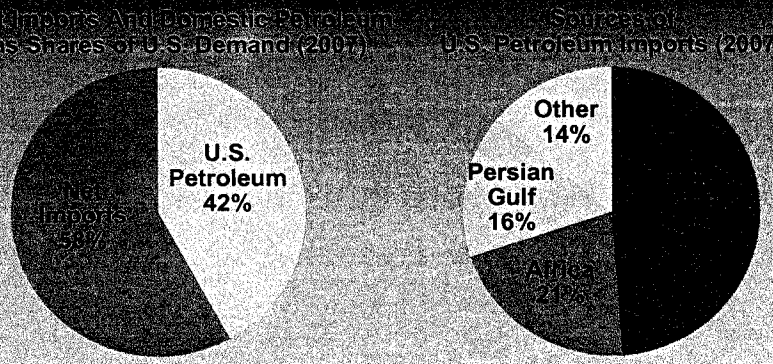
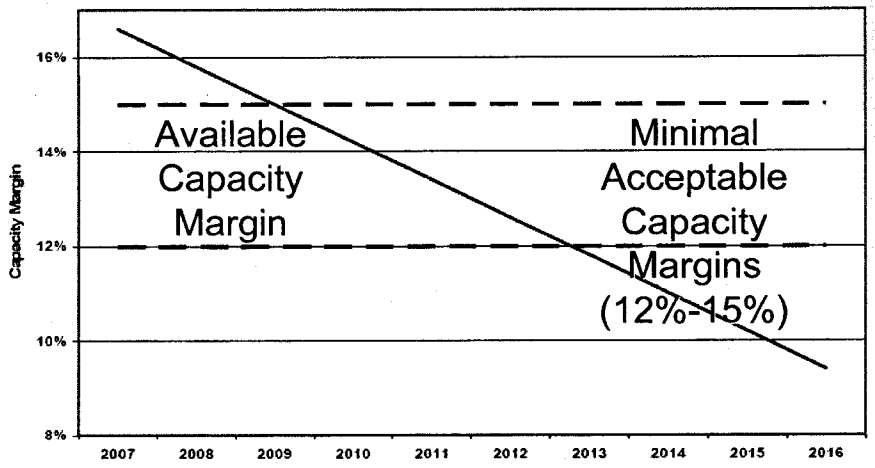


Source: Energy Information Administration

IEA now expects consumption to reach 106 million barrels/day in 2030. world consumption now stands at 86 million barrels/day



NERC Forecasts of U.S. Electricity Capacity Margins

Sources: NERC 2007 Long-Term Reliability Assessment, October 2007, and Management Information Services, Inc

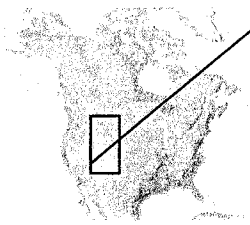
Selected North American World-Class Energy Resources within the Western Inland Energy Corridor

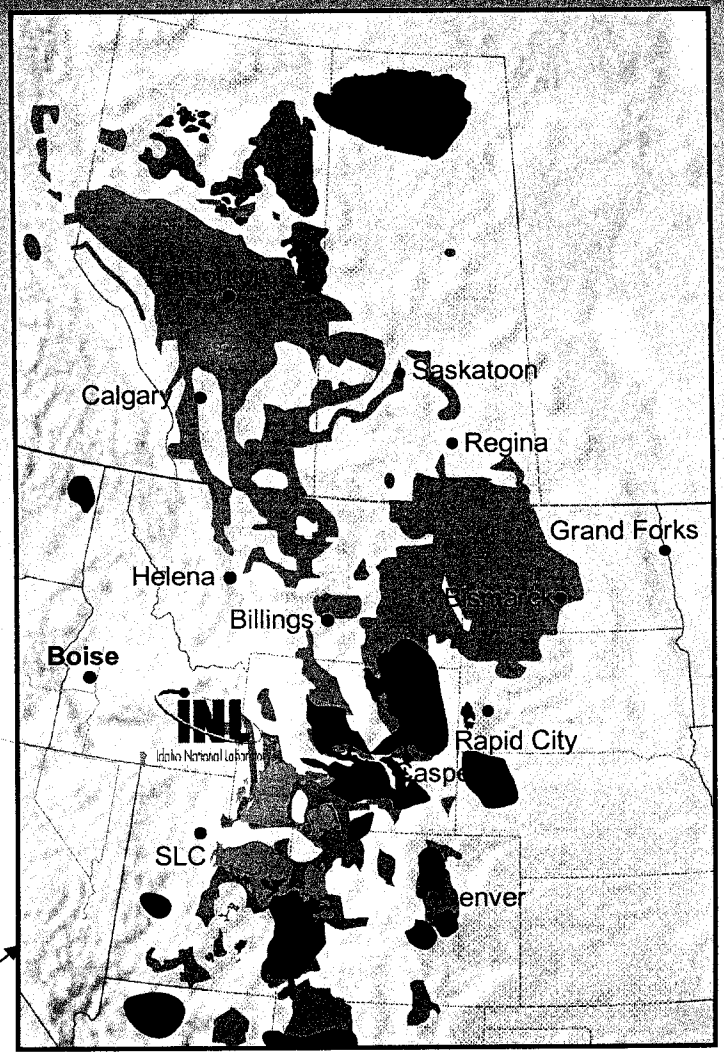
- The Western Inland Energy Corridor contains **world-class** conventional and unconventional fossil energy reserves complemented by significant **renewable** energy, energy mineral resources, **nuclear energy** potential, and **energy infrastructure**

- These resources are located within a setting containing rich wildlife corridors, critical water resources, and other economic minerals (including those used for producing fertilizers)

- Development of these resources will require **integrating, optimizing and stewarding** a diverse set of regional energy resources (at multiple scales), interconnected by a dependable delivery infrastructure, and developed in an ***environmentally progressive*** manner

The Western Inland Energy Corridor contains energy resources strategic in meeting N. America's energy security challenges





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Selected Energy Corridor Trends

- Increasing exploitation of unconventional fossil energy resources
- Emerging renewable portfolio standards and increasing demand for renewable energy resources; need for enabling infrastructure.
- Federal and State/Provincial policy driving innovation, i.e., related to CO2, water, etc., but also uncertainty;
  - States/Provinces desires to move up the energy value chain, including investing in transmission
  - Blurring of "energy borders" (policy, economics, R&D, infrastructure)
  - Emerging DoD interest in developing domestic corridor resources

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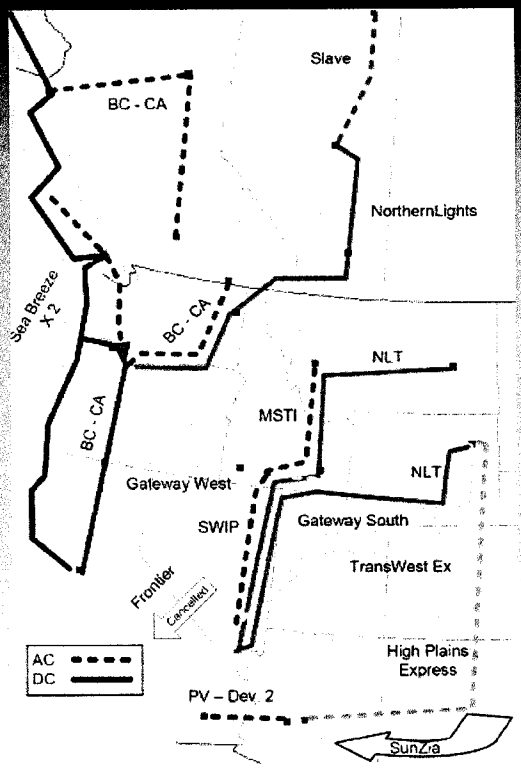
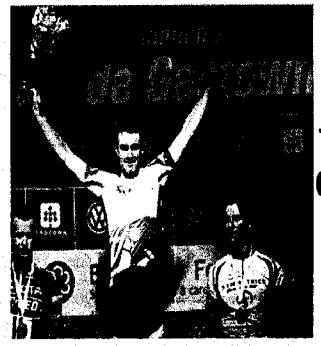


Potential Large-Scale New Western Transmission Projects (Courtesy of TransCanada, Inc.)



GOING FOR GOLD

Prairie Atoms: The Opportunities and Challenges of Nuclear Power in Alberta and Saskatchewan

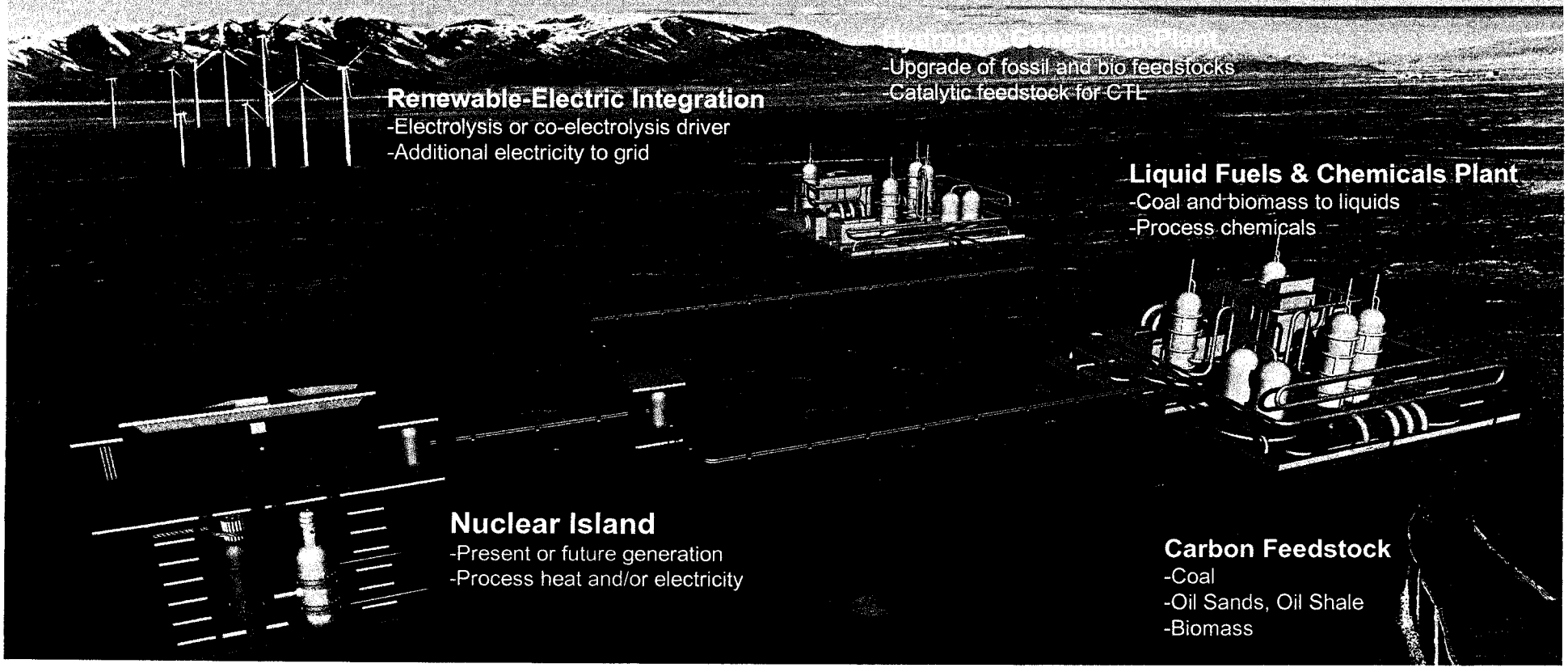
September 2008 **Duane Bratt, PhD**

Idaho, Alberta and Saskatchewan have a growing interest in nuclear energy integration

Transformational Vision: Establishing Regional Hybrid Energy Systems & Carbon Management Approaches:

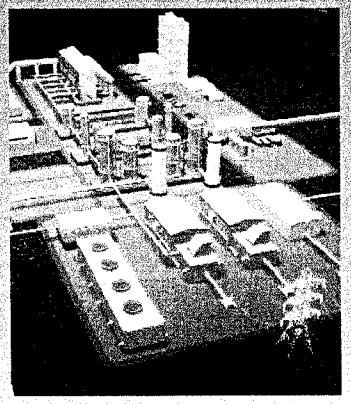
Carbon energy sources will continue to supply most of the world's energy needs for the foreseeable future.

Hybrid energy systems can provide increased production efficiency and help mitigate environmental impacts



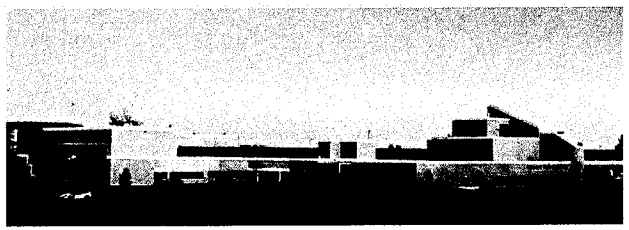
Selected Regional Opportunities in the 2010's: building upon the Energy Corridor Foundation

- Provide fuels and electricity in response to potential near-term shortages of energy.
- Create regional sustainable prosperity through wise use, higher-value-added manufacturing and export while preserving our natural resources
- Position regional businesses for robust energy sector market place
- Build world-class research laboratories and technically attuned university system" as backstop for industrial enterprise providing innovation
- Form bi-national regional political, economic and R&D leadership.
- Lead energy transformation for the Nation

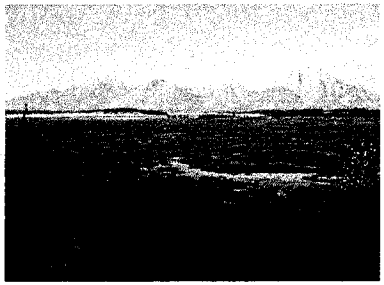


Energy Cluster
Belleplaine Polygen
Site, SK;

Pacific NorthWest Economic Region



World Class Research Centers



Stewarded wildlife, waters, natural/energy resources

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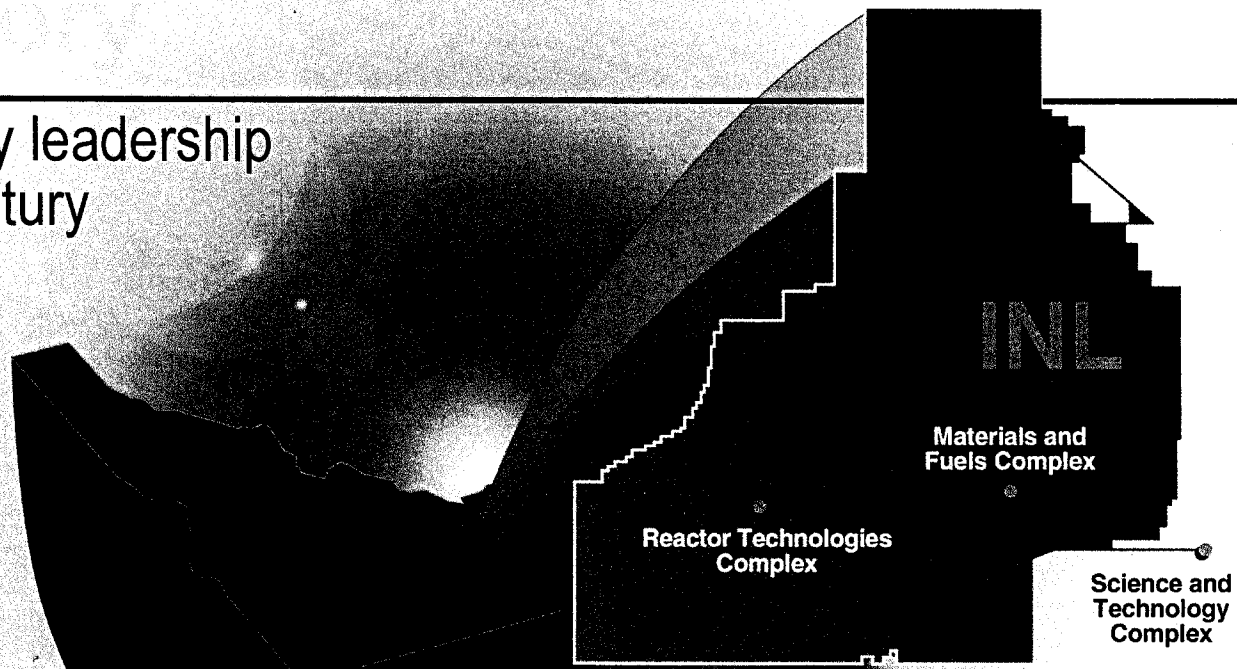
Energy security leadership for the 21st century



Michael Hagood
208.526.5315
michael.hagood@inl.gov

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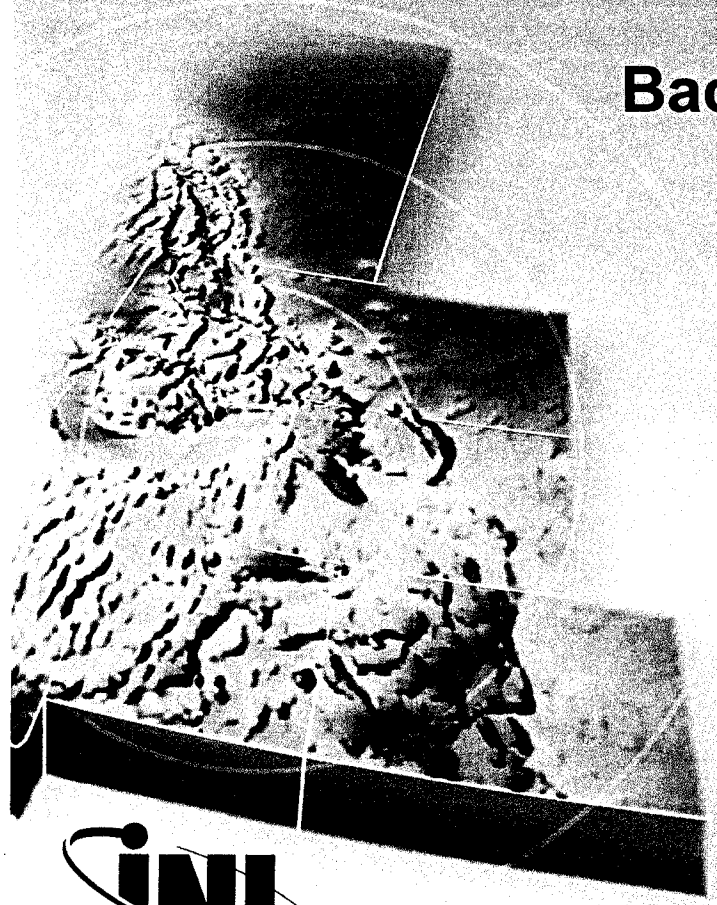
Western Energy Basin Initiative

Backup Slides



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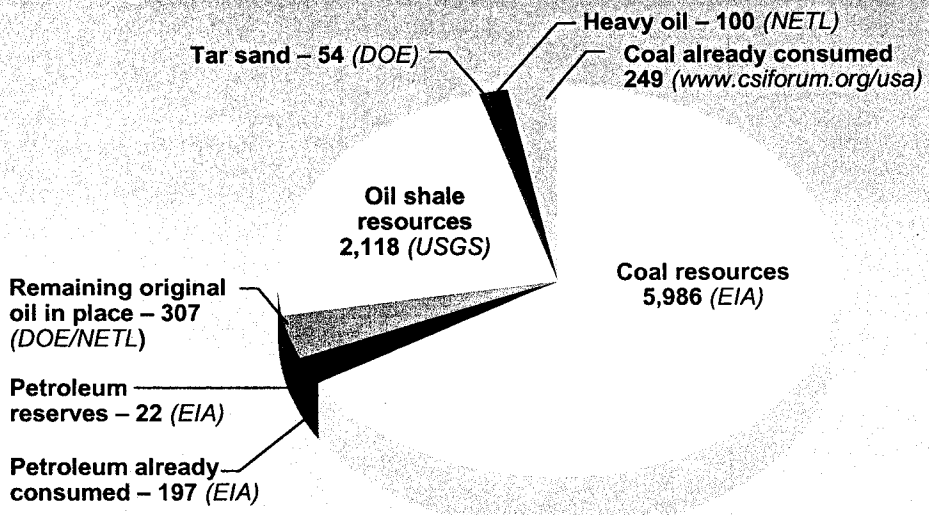
The Opportunity: Utilizing U.S. Endowment of Unconventional Solid and Liquid Fuels Resources*

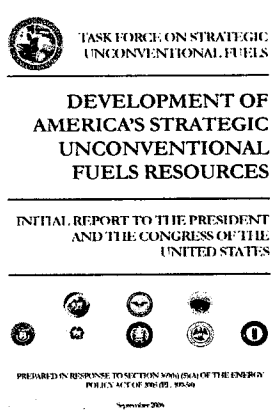
U.S. Solid and Liquid fuels Resources
(Total Endowment 9,033 Billions Oil Equivalent)*



*no including energy losses in transformation to liquid fuel
Units are in Billion bbl-oil-equivalent coal-10K BTU/lb;oil-6M BTU/bbl

Source: Unconventional Fuels Task Force Report: Development of America's Strategic Unconventional Resources – Sep 2006 ; A. Dammer DOE, 2008

"The Nation is substantially at risk, from an economic and security perspective, to warrant development of an unconventional fuels program with attendant policies and government actions to promote and accelerate industry development"

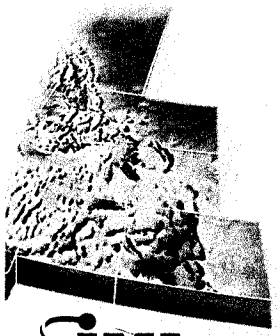

TASK FORCE ON STRATEGIC UNCONVENTIONAL FUELS

DEVELOPMENT OF AMERICA'S STRATEGIC UNCONVENTIONAL FUELS RESOURCES

INITIAL REPORT TO THE PRESIDENT AND THE CONGRESS OF THE UNITED STATES

PREPARED IN RESPONSE TO SECTION 369(h) (5)(A) OF THE ENERGY POLICY ACT OF 2005 (P.L. 109-58)

DOE is mandated by U.S. EPAct 2005 to *coordinate the creation and implementation of a commercial strategic fuels development program,* derived from domestic unconventional fuels resources. *"including, but not limited to oil shale and tar sands, in an integrated manner"*



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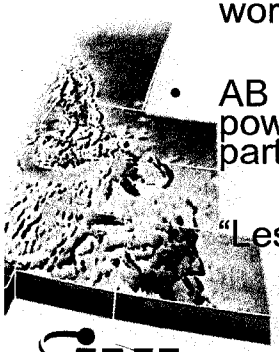
The Importance of Alberta and Saskatchewan for U.S. Energy Security and as a Marketplace

- Canada is U.S. #1 supplier of oil and gas imports; 16% of U.S gas consumption; 12% of U.S. petroleum consumption, most coming from AB/SK
- Canada is a long-term sustainable and geopolitically stable strategic source of energy for the U.S. (Fuels & Electricity)
- There is increasing interdependency of cross border energy infrastructure and policy
- AB and SK are providing energy leadership in technology for recovery, CO_2 capture, use and storage projects
- AB seeking to increase production of oil sands and electricity; significant R&D need to address grand challenges; shortage of workers
- AB and SK will become international energy powerhouses, with increasing potential to partner with adjacent states.
- "Lessons Learned", applied to U.S.



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"Energy Border Blurred", Relative to oil sands environmental concerns "..... it's also an energy security question and it could be a fundamental question in Canada-U.S. relations", Daniel Yergin, Cambridge Energy Research Associates, Reuters News Sep 2008

GOING FOR GOLD

Prairie Atoms: The Opportunities and Challenges of Nuclear Power in Alberta and Saskatchewan

September 2008 **Duane Bratt, PhD**

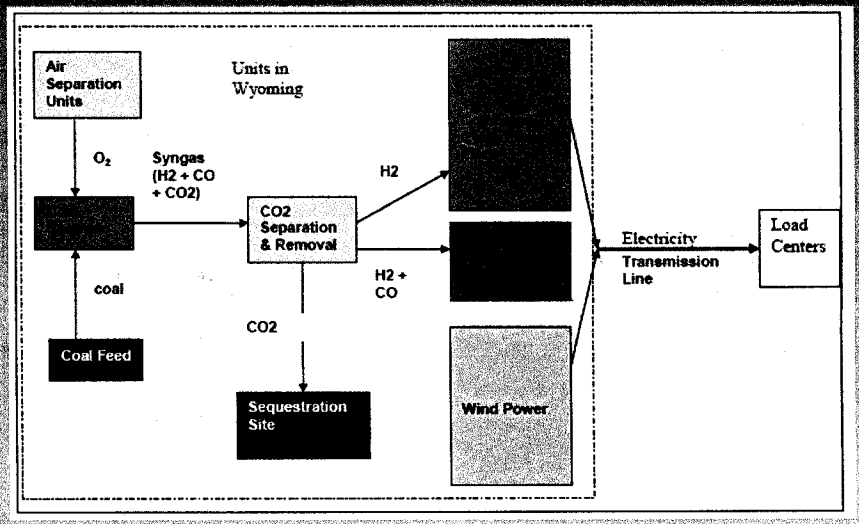
Alberta and Saskatchewan are global energy leaders that have a growing interest in nuclear energy integration

Example: Advanced Coal-Wind Hybrid

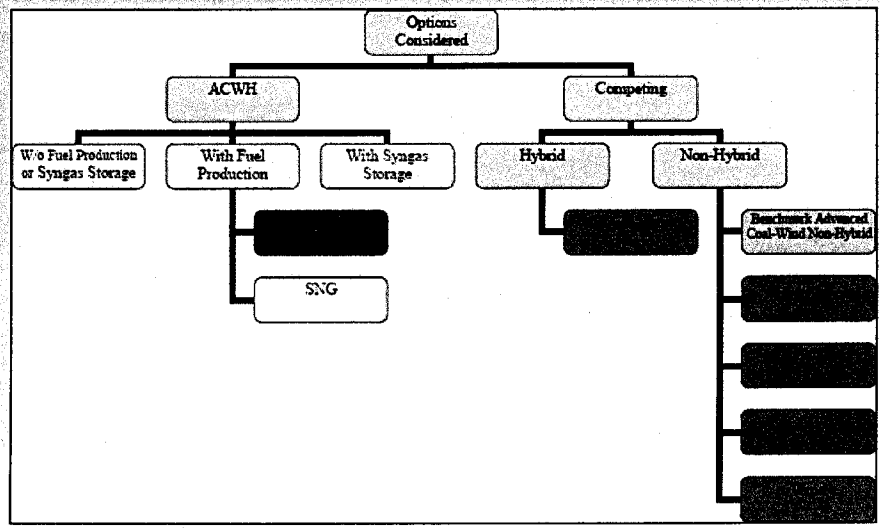
- DOE has completed a screening level analysis addressing combining wind farms with advanced coal generation facilities, operating them as a single generation complex (in the Western U.S.)

- The preferred option selected is to produce electricity with fuels (syncrude).

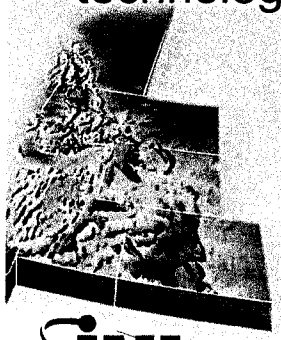
- Preliminary results indicate this preferred option lowers levelized cost of electricity, offers some net but modest benefits, has a low emission footprint and is competitive with other generation technologies



Advanced Coal Wind Hybrid: Basic Configuration



Advanced Coal Wind Hybrid and Competing Options:



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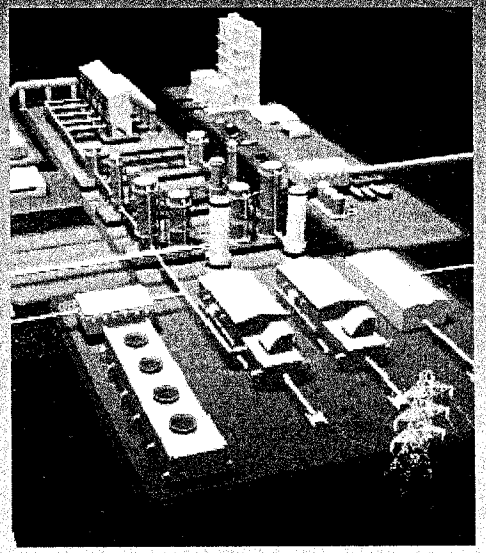
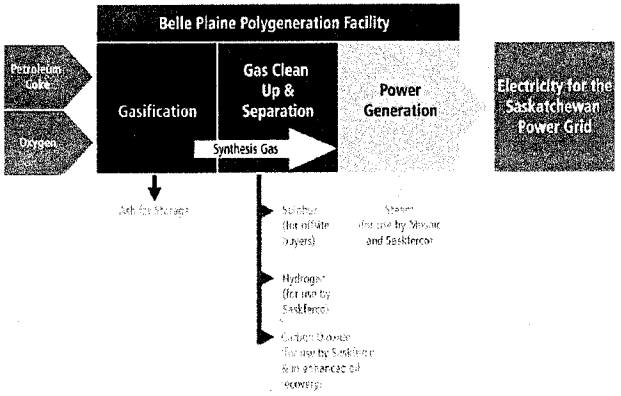
Source: Lawrence Berkeley National Laboratory Report 1248E: Advanced Coal Wind Hybrid: Economic Analysis, December 2008

Example: Belle Plaine Polygen Site, Saskatchewan

- The plant would generate ~300 megawatts of clean electricity for SK, enough to power approx 300,000 homes with gasification of fossil energy resources
- Will also supply hydrogen, steam and carbon dioxide to two proximal large industrial fertilizer operations
- Additional carbon dioxide would be sent to nearby oil fields and injected deep underground for enhanced oil recovery
- If approved, construction of the facility could begin in 2010, with the facility beginning production in 2013





Source: Project Description - Belle Plaine Polygeneration Project, Belle Plaine, Saskatchewan, April 18, 2008

The plant would be constructed within an industrial corridor that presently hosts the Mosaic Potash Mine, a SK nitrogen fertilizer plant, Terra Grain fuels and the Canadian Salt Company

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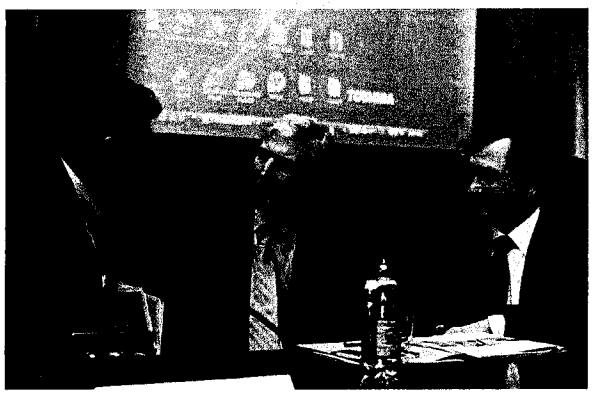
Regional Clean Energy Leadership

- Securing our energy future will require stewarding, integrating and optimizing a diverse set of western inland energy corridor resources, interconnected by a dependable delivery infrastructure and developed in an environmentally progressive manner

INL is working with state and provincial governments, regional research institutes and industry to address regional energy challenges

- Various research institutes within the energy corridor have the opportunity to collaborate under regional leadership to provide the technical underpinning needed to address development and stewardship of the world-class resources in the corridor.



- In parallel, a **Western Inland Energy Corridor council** comprising bi-national regional political leadership could be formed to help address this regional development future.

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